The index numbers stated in ( ) reappear within the spare part figures (block diagram, schematic diagram of cooling plant) and the spare part lists.

5.1 Dismantling the Housing

5.1.1 Front Panel (100)

- Open the lid. **Pull out the mains plug.**
- Pull the unit a little over the table's rim and remove both screws (105) from the bottom of the front panel.
- Pull the front panel's lower rim a few centimetre to front and push it vertically out of the upper plastic frame. **ATTENTION!** Do not pull the front panel too much to front! Doing so could tear off the upper plastic holders!
- For continuing the disassembly remove or disconnect all wires.
- Refitting the front panel is performed analogously in reverse order.

5.1.2 Lid (130)

- Open the lid. **Pull out the mains plug.**
- Remove the 4 Allen head screws (135), using a 5 mm key and take off the lid.

5.1.3 Casing (120)

- Remove the front panel and the lid (see 5.1.1 and 5.1.2).
- Remove the 3 Phillips screws (125) in front and both lateral.
- Press both legs of the torsion spring down and fix them with a 5-mm set screw (or one of the 4 allen head screws) in the bore of the frame.
- Lift the housing at the front and the rear, pull upwards past the legs of the torsion spring and flip over to the front. If the leg is fixed with an Allen head screw, carefully widen the opening of the housing with a screw driver!
- Pull off mains switch wires and take off the casing inclusive lid sealing.
- Reassemble the device analogously in reverse order.
- Insert the rubber sealing with the gluing seam in front and press on evenly all around

5.2 Replacement of the Sealing Elements

5.2.1 Motor Rubber Cover (221)

Temperature probe and motor are glued to each other! When disassembling the two, damage to either or both of them cannot be excluded!

- Open lid, unplug mains plug
- Loosen rotor nut (90) with 10-mm socket wrench (91) and pull out rotor.
- Press out motor cover from the lower edge to the middle and pull upwards off the plastic flange of the motor.
- Carefully pull motor cover and the two insulating washers (224) situated underneath upwards along the drive axis and deposit on the side of the temperature probe within the rotor chamber.
- When the motor cover is replaced, the temperature probe must be disassembled and adjusted anew upon reassemble (see section on removal of the temperature probe)!
- When the motor cover is reinserted, the upper rubber sleeve must be pressed in onto the plastic flange (231) of the motor and must be pressed down so that the ring-shaped swelling fits precisely into the groove of the flange.
- Check: When finally flanging the inner sleeve lip (covers the upper rim of the plastic flange), the outer edge of the sleeve must slant downward so that condensation water may not enter the motor bearing.
- For fixing and as a protection against torsion, the motor cover plus flange must be secured at the edge with 3 drops of Loctite 495.

5.2.2 Lid Gasket (123)

- Unscrew the casing (120) and pull it off from the bottom plate (360).
- Separate the sealing's edge from the chamber's rim by pulling it inside.
- Lift off the gasket on this place.
- Work all the way round, until the gasket can be removed completely.

Assembling instructions

- Push the gasket over the rim of the rotor chamber, starting with the gluing seam in front.
- Work from both sides to the rear, but do not lengthen the gasket by this way.
- While doing so press the sealing edge under the casing's rim.
- Fold the rim of the rubber sealing over the rotor chamber's opening, starting from front to rear
- Press the casing back again onto the bottom plate and assemble it analogously in reverse order.
- The lid gasket must be completely sit close on the rotor chamber wall!
- The rotor chamber must be sealed completely, when the lid is closed correctly!

5.3 Replacement of Mechanical Components

5.3.1 *Lid Lock Assembly (210)*

The lid lock assembly encompasses both lid locks with two built-in microswitches each.

- Disassemble housing (see 5.1.3).
- Expose cables for microswitches and lid coils (undo cable tree, unscrew cable clips).
- Remove outer (214) and both inner (215) fastening screws from each of the locking mechanisms.
- Press microswitches (211) through the frame opening inside and pull both unlocking systems upwards and out.

Note for mounting

- Align rubber spacer (212) and screw locking systems on.
- Do not over-tighten the screws!
- The locking pins must not jam! Secure Screws with Loctite 221.
- Fix the cable again to the cable tree and fasten with clips. Cables may not come in between fan blades!
- Once the instrument is installed, check locking mechanism several times by repeated opening and closing.

5.3.2 *Torsion spring (202*

- Disassemble housing (see 5.1.3)
- Remove set screw(s) or Allen head screw (135) from legs in order to disassemble the housing.
- Screw out fastening screw (pan-head 206) of the torsion spring and unbend the spring.
- Remove fastening nut (205) of the swivel leg (203) on the side of the spring and push the shaft (200) to the left until you can remove the spring.
- For removal of the shaft, press right-hand slide bush (204) out and push the shaft to the right until it leaves the left-hand slide bush.
- Lift the shaft on the left and pull obliquely to the left out of the right-hand frame opening.

For mounting and adjustment of the torsion spring you must follow the instructions in section 2.4, please note also the drawing on page 6-4.

5.4 Replacement of Electrical Components

5.4.1 *Fuses (113) on main board*

- Dismantle the front panel (see 5.1.1) and put the device far enough to the rear so that the panel can be placed without stretching strain of wires on a suitable depot (e.g. box) in front of unit.
- Check the micro fuses and if necessary replace them by equivalent and undamaged ones.
- Perform a test run and search for blowing cause.
- Reassemble the device analogously in reverse order.

5.4.2 *NV-RAM (113) on main board*

Please note NV RAM does not belong to the board and it has be ordered separately

- Notice old displayed NV-RAM's version number when powering on (second No. in sequence)
- Depose the front panel as described in 5.4.1.
- ATTENTION - CMOS components! Discharge your body before handling!
- Notice correct position of NV-RAM (8 pins) and pull carefully out of socket.
- Reinsert the new NV-RAM correctly.
- Reassemble the device analogously in reverse order and check the displayed NV-RAM's version number.
- Note! A new NV-RAM version will include parameter changes (e.g. new rotor type or any speed limitations etc.) which can be verified in the display.

5.4.3 *Microcontroller (111) on main board*

The microcontroller normally comes with the board. It could be possible that there will be a change sometime necessary when there will be upgrades.

- Notice the old Controller's version number when powering on (first displayed No.).
- Depose the front panel as described in 5.4.1.
- ATTENTION - CMOS components! Discharge your body before handling! Notice the correct Controller position (CPU) and pull out carefully. ATTENTION - do not damage the socket (use cranked pliers)!
- Reinsert the new Controller chip correctly.
- Reassemble the device analogously in reverse order and check the displayed Controller's version number.

Note! A new Controller version will include program changes (e.g. modifications of control functions) which might be verified only by measuring performances.

5.4.4 *Main Board (110)*

The key and indication board is part of the main board and cannot be ordered separately!

- Depose the front panel as described in 5.4.1.
- Disconnect all terminal connections as: mains supply XN, compressor box XG, both lid solenoids XC and both fans XK.
- Pull out all plug connectors as: protecting earth conductor PE, lid switches XA, temperature sensor XU, motor lines XM (1-3) and over-temperature cut-out XB (1+2).
- Remove all fastening screws of the main (117) and indication board (115), remove the washers (116) and subsequently the boards.
- Touch a grounded receptacle to discharge your body before touching the sensitive CMOS components.
- Take the NV-RAM (112) out of box (or re-use the old but trouble-free component) and insert it into the socket of the new main board (see 5.4.2 and 5.4.3).
- The components which is installed at the socket must be removed and scrapped
- Mount the new board onto the front panel, replace the washers and re-tighten all nuts.
- Do not mix up disconnected cables during re-connection!
- Reassemble the device in reverse order and perform a test run, making sure the drive turns in the right direction (see imprinted arrow on rim of rotor chamber)!

5.4.5 *Mains switch (121)*

- Remove the casing (see 5.1.3)
- Compress both snap hooks of the mains switch and press the switch from inside out of the casing's opening.
- Pull off the cable plugs and transfer them to the new mains switch.
- Spread the snap hooks a little, refit the mains switch and assemble the unit completely.

5.4.6 *Mains input socket (361)*

- Remove both fixing screws (365) and pull out the socket carefully
- Pull off the cable plugs and transfer them to the new socket.
- Insert the socket and re-tighten it on the tab of the bottom plate.

5.5 Replacement of Drive Components

5.5.1 *Drive Motor (230)*

- Remove the casing (see 5.1.3).
- Remove the rubber flange and both isolating disks (see 5.2.1).
- Disconnect the leads for motor XM (1-3) and over-temperature switch XB (1+2)
- Set the wires free from cable harness and open the cable retaining strap.
- Unscrew the 3 Allen head screws (240) with a 5mm hexagon key having a length of 15cm and remove them together with the toothed discs (239).
- Lift the motor a little, unscrew the grounding receptacle and remove the motor out of the spin chamber. Take care when stripping the wires through the isolation!
- Reassemble the motor analogously in reverse order and fasten the 3 allen head screws and lock them with Loctite 221. Perform the distance check as described in 2.5 and a test run. Check the sense of rotation (see imprinted arrow direction) and mix up 2 leads on terminal XM in case of disorder.

5.5.2 *Motor supports (235)*

All 3 rubber supports (235) have to be replaced at the same time! We recommend a yearly change at every general inspection. By the way the 6 double-sided sandpaper discs (236) must be exchanged, too. A maintenance kit # 70904580 is available

- Remove the drive motor (see 5.5.1).
- Remove all 8 hexagon head screws (308) for the fastening of the traverse support and take it out of the frame's left side.
- Unscrew the 3 nuts and remove the 3 rubber supports together with the 6 sandpaper discs.
- Fasten the new motor supports evenly (use a torque key: 10 Nm) and secure the nuts (238) with screw locking lacquer (Loctite 221).
- Reassemble the device in reverse order, thereby pay attention to the installation and adjustment instructions in section 2.5! At last perform a test run.

5.6 Replacement of Parts for the Refrigeration System

5.6.1 *Temperature Sensor (220)*

For mounting the temperature sensor, please note the drawings page 6-5 and 6-6!

- Disassemble housing (see 5.1.3) and unplug XU.
- Uncover the connecting cables of the cable tree and loosen the cable clips
- Disassemble motor cover (see 5.2.1) and remove complete with temperature probe (sensor).
- Mount new temperature probe and new motor cover (221) according to former positioning, making sure that the tip of the probe is located within the labelling window on the motor cover (check from above, see page 6-5 figure B)
- Reassemble motor cover with temperature probe according to section 5.2.1.
- Adjust the distance between temperature probe and motor cover by pulling or pushing the cable for the temperature probe in the slanted opening of the motor cover until the distance between tip of the probe and motor cover is 2.5 + 0.5 mm
- Reassemble centrifuge in reverse order. Insert rotor and make sure that neither the temperature probe nor spacer nor temperature probe cable rub against the rotor!
- If the adjustment is correct, fix temperature probe on both sides and the temperature probe cable at the motor cover using a drop of Loctite 495 (#20470056).

5.6.2 *Fans (310)*

Both fans (ventilators) aspire air for cooling from the front through the ventilation slots and the wire mesh. The air is forced past the power transistors, the lamellae of the condenser and the motor windings and exits through the rear ventilation slots.

Take care that the Armaflex cut (218) seals the condenser tightly against the casing. Otherwise the circulating air may form shortcuts via the slots or openings, thereby reducing cooling power and longevity of both drive and compressor.

- Remove the casing (see 5.1.3)
- Set the wires free from cable harness and open the cable retaining strap.
- Remove the fastening screws (311), take out the defective fan.
- Pull off the wire connectors, unscrew the protecting earth conductor and remove the defective fan.
- Transfer grounding conductor to the new fan and reconnect the wires.
- Pay attention to air flow direction (see imprinted arrow). Reassemble fan and unit in reverse order and take care to the Armaflex sealing.

5.6.3 Components of the Cooling Cycle

When working on the cooling cycle the general guidelines regarding the handling of refrigerants must be observed! The compressor oil must be recycled, too, in case of a compressor break down!

Refrigerant: R134a (CFC-free)
Filling quantity: 135 g (individually the compressor labelled amount is relevant)

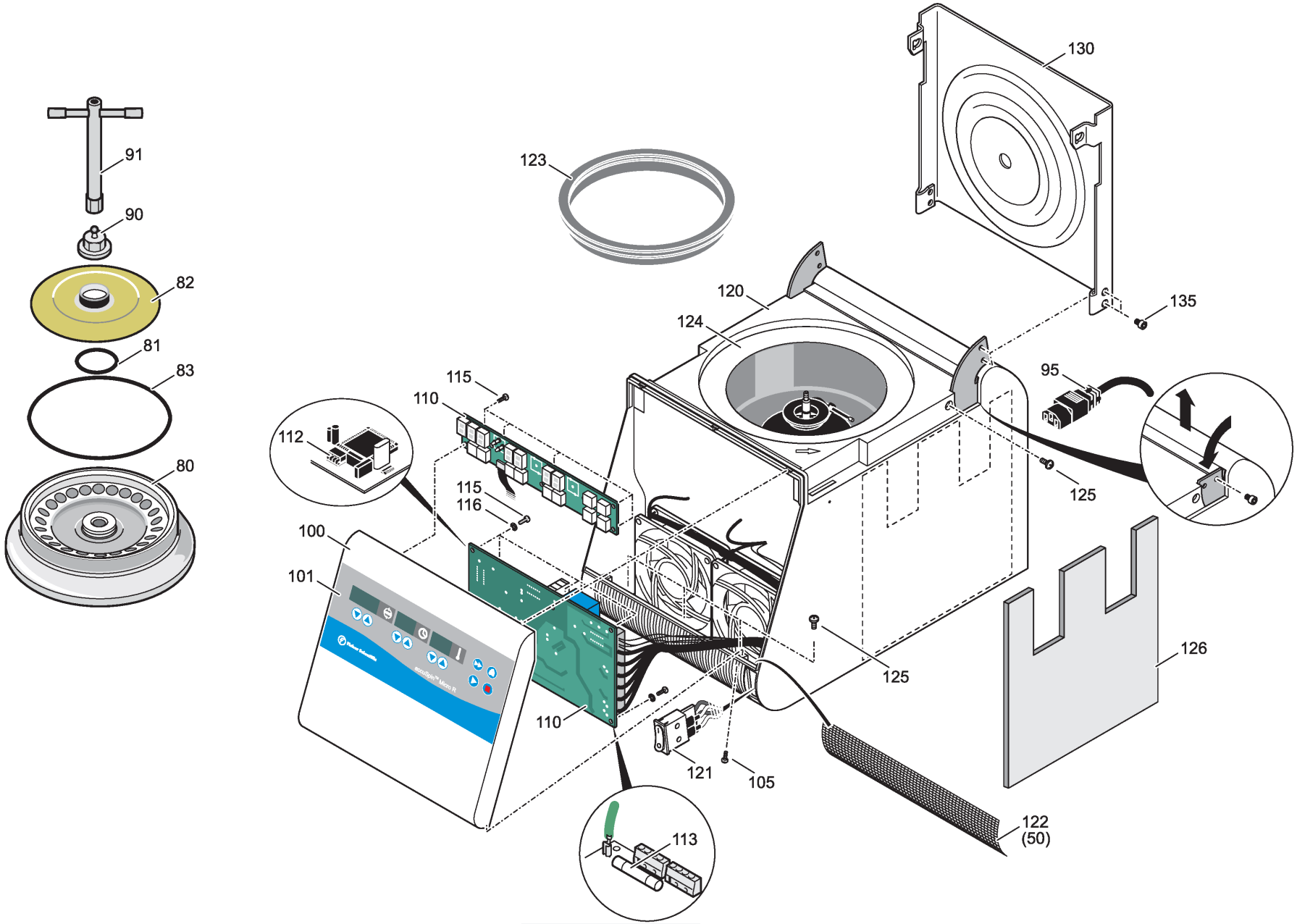
There must not be used any kind of hoses, armatures and manifold gauges which are already contaminated with CFC based refrigerants. Otherwise the compressor oil will become an aggressive condition and will destroy the compressor in a short time.

Procedure for replacing defective components of the cooling cycle

- Mount a pinch valve onto the compressor's service line (suction line)
- Suck off the refrigerant and recycle it
- If the compressor (340) is defective, let the oil run out into a bowl and recycle it, too.
- Unsolder the defective component(s) and replace additionally the dryer cartridge (325).
- Let a little amount of dry nitrogen gas stream through the tubes when soldering
- Do the evacuation and refill the system with the exact amount of refrigerant via a new external dryer (check amount with a balance or filling cylinder)

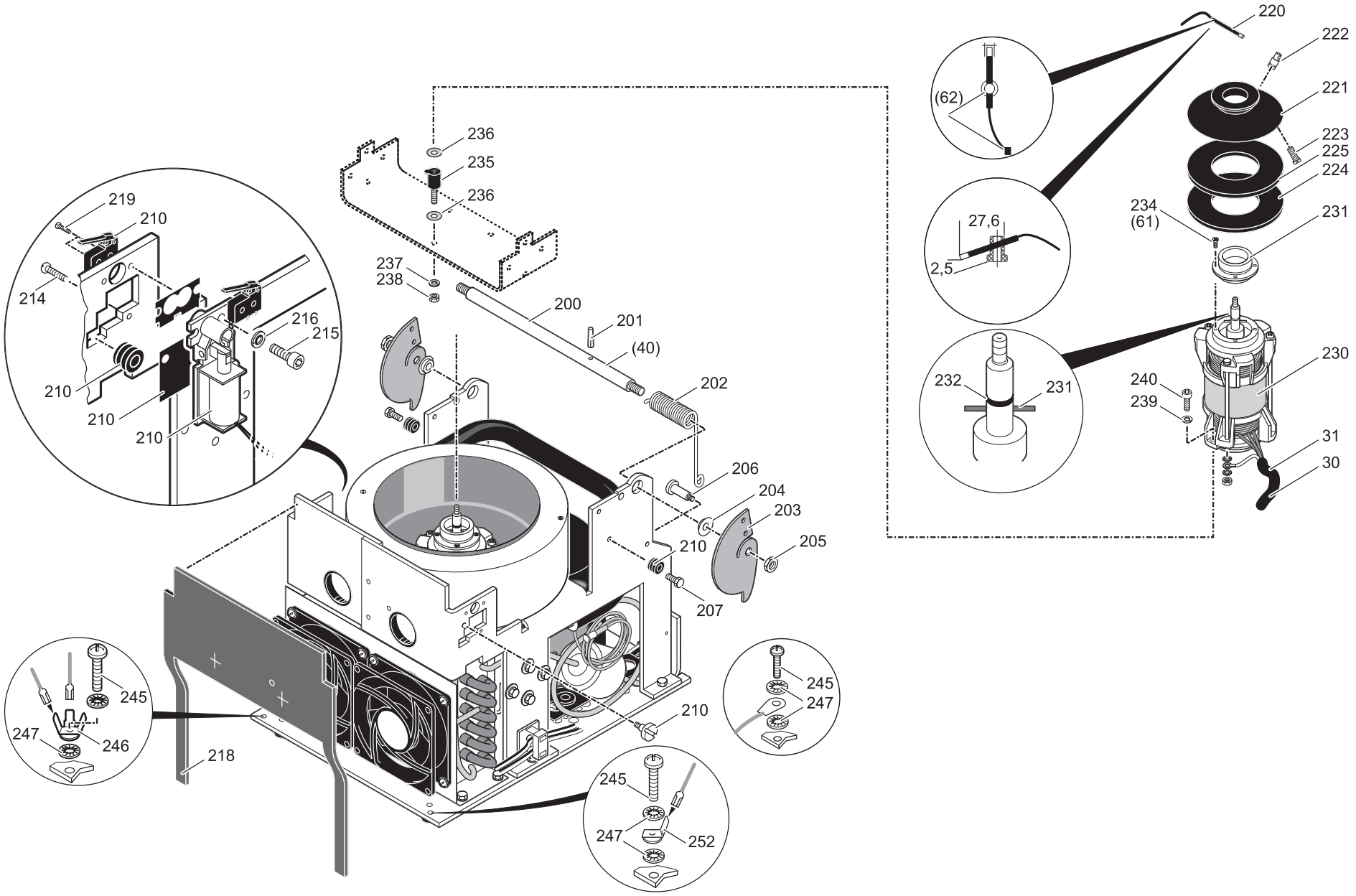
The pinch valve must not be left on the line! Close the system hermetically (solder close) and fix the service lines using cable ties with a little drop to let the oil run back after transportation.

Re-assemble the unit in reverse order and test the cooling system (see Servicing Schedule).



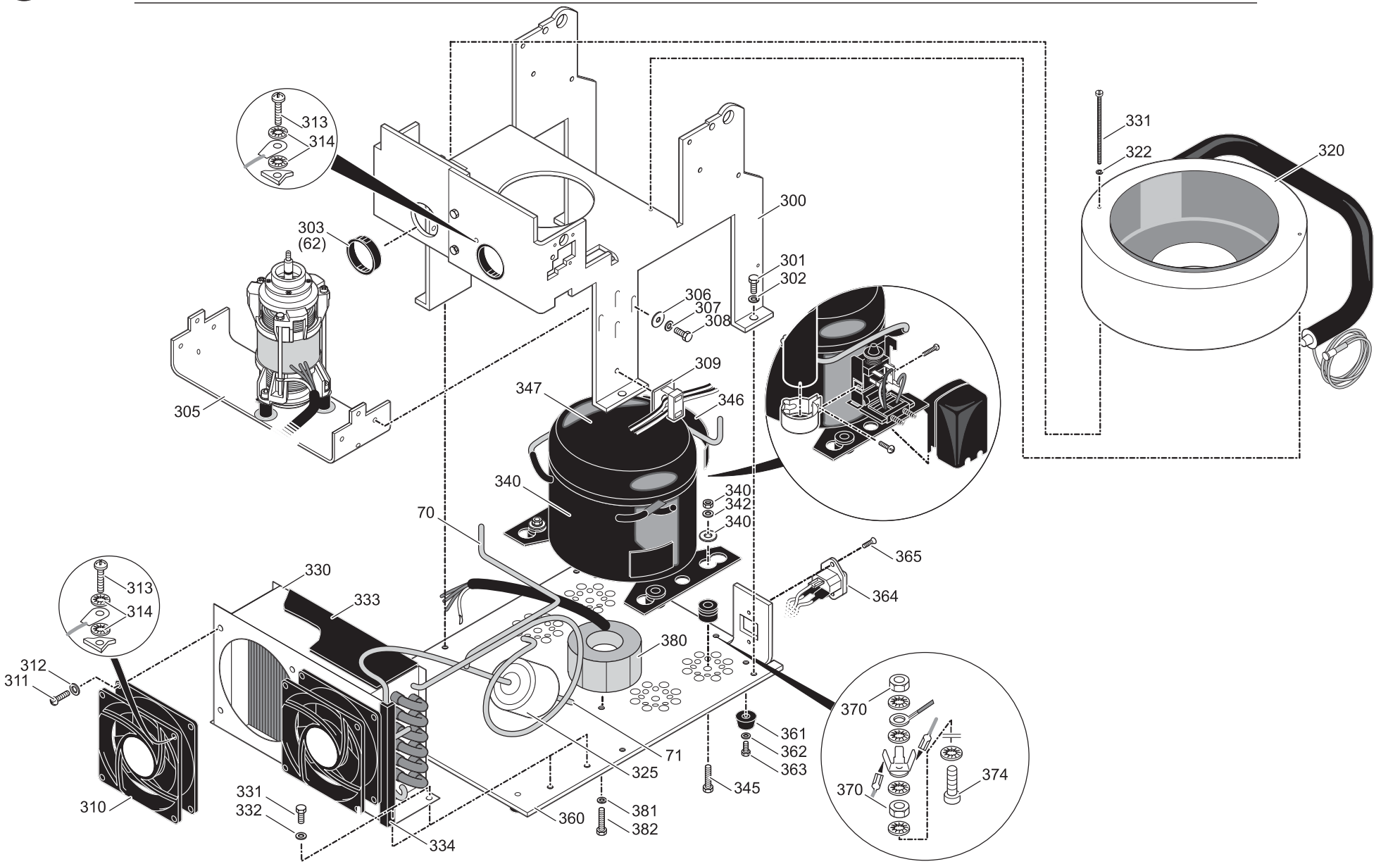
Edition: 01

Housing parts, Boards



Edition: 01

Frame and Drive parts



Edition: 01

Parts on Bottom plate